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JUN 1 3 2005

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Jeffrey J. Spiegelman, Daniel Alvarez, Jr., Allan Tram and Russell J. Holmes		
Application No.:	10/683,903	Group:	1746
Filed:	October 10, 2003	Examiner:	Carrillo, Bibi S.
Confirmation No.:	3062		

For: METHOD FOR THE REMOVAL OF AIRBORNE MOLECULAR CONTAMINANTS USING OXYGEN GAS MIXTURES

DECLARATION OF DANIEL ALVAREZ JR., Ph.D., UNDER 37 C.F.R. §1.132

Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22213-1450

Sir:

The undersigned, Dr. Daniel Alvarez Jr., a United States citizen, declares as follows:

1. I am a co-inventor of the above-captioned patent application.

2. As discussed in the Office Action mailed on February 16, 2005, and reiterated by the Examiner during a telephonic interview on April 27, 2005, the use of the phrase "pure oxygen gas" in Somekh (U.S. Patent No. 6,427,703) is interpreted by the Examiner as an oxygen gas having a contaminant concentration of zero (i.e., not having a single atom or molecule of contamination).

3. The term "pure oxygen gas," however, does not refer to a gas having a contaminant concentration of zero. In fact, the phrase "pure oxygen gas" would not suggest a gas having zero contaminants to one of ordinary skill in the art.

BEST AVAILABLE COPY

4. Exhibit A presents a page of an Air Products Catalog from 1998, which documents various high purity grades of oxygen gas that were commercially available. Air Products is a leader in the supply of "pure" gases to the chemical and semiconductor industry. The product "ultra high purity/zero" oxygen is, in fact, rated as 99.8% pure, having a total hydrocarbon content of as much as 500 parts per billion. The product "ultrapure carrier" oxygen is, in fact, rated as being 99.996% pure, having a total hydrocarbon content of as much as 500 parts per billion. The product "research" oxygen is 99.998% pure, having a hydrocarbon content of as much as 200 parts per billion.

5. Exhibit B presents a print out of a web page from the Air Products website describing their offerings of "Pure Gases." In particular, the page states that "[t]his section provides details of the pure gaseous and liquids chemicals, *and their respective purities* . . ." (emphasis added).

6. Exhibit C presents the specific offerings of "Ultra High Purity Gases" from the Air Products website listed above. In particular, three entries are presented for oxygen specified as having 1,000 parts per billion total hydrocarbon content ("Premier"), 500 parts per billion total hydrocarbon content ("UltraPure"), and 100 parts per billion total hydrocarbon content ("UltraPure Plus"). As stated on the first page, "[Experis™ ultra high purity gases] contain the lowest levels of critical impurities available on the market."

7. Exhibit D presents a print out of a web page from the Scott Specialty Gases website entitled "Pure Gas Products." Under the link to the corresponding oxygen product is a webpage presenting two grades of oxygen: one has a total hydrocarbon content as high as 1,000 parts per billion and the other has a total hydrocarbon content as high as 100 parts per billion.

8. Exhibit E presents a print out of a web page from the Wesco Gas Products website. In particular, the link to "Pure Gas" is presented. The gases are from Wesco's vendor BOC gases, the world's largest producer of industrial gases. The table under "Pure Gas

Information & Tables" presents the various gas purities associated with each gas grade. Indeed, every listed grade in the table has at least 1,000 part per billion of total impurities. No pure gas listing has zero contaminants.

9. These exhibits demonstrate that the phrase "pure oxygen gas" does not mean that the oxygen gas contains zero contaminants.

10. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

June 7, 2005
Date

Daniel Alvarez Jr
Daniel Alvarez, Jr., Ph.D.

Exhibit A: Excerpt from a 1998 Air Products catalog entry.

Exhibit B: Webpage from Air Products website (viewed 10 May 2005) – www.airproducts.com/specgases/pure/20001.htm

Exhibit C: Product sheet from Air Products website providing the purity limits of various gases including oxygen (viewed 10 May 2005) - www.airproducts.com/specgases/pure/20001.htm

Exhibit D: Webpages from Scott Speciality Gases website (viewed 10 May 2005) – www.scottsemicon.com/pures/pindex.html

Exhibit E: Webpage from Westco Gas Products website (viewed 10 May 2005) – www.wesco-gas.com/products/gas/puregas.html

AIR PRODUCTS

Oxygen (O_2)

A colorless, odorless, oxidizing compressed gas at high pressure.

Toxicity: Nontoxic; exposure to high concentrations adversely affects pulmonary and central nervous systems.
Fire Potential: Strong oxidizer; supports and vigorously accelerates combustion. Avoid contact with oil, grease, or other combustible materials.
Compatible Materials: Noncorrosive; structural materials must be suitable for oxygen service.
Molecular Weight: 32.00
Specific Volume at 70°F and 1 atm: 12.08 ft³/lb
DOT Hazard Class: Nonflammable Gas (2.2)
DOT Label: Oxidizer and Nonflammable Gas
DOT ID No.: UN 1072
CAS No.: 7782-44-7

Cylinder Size	Cylinder Dimension (in.)	Cylinder Pressure at 70°F (psig)
A	9 x 55	2,640
C	7 x 33	2,215
D	4 x 17	2,215
4X(Al)-100	4 x 10	850

	Ordering Information				Recommended Equipment		
Specification (molar ppm)	Cylinder Size	Contents ft³ (m³)	Standard Valve Outlet (CGA)	Product Number	Description/ Product Number	Delivery Pressure Range (psig)	Page Number
RESEARCH 99.998% Guaranteed Spec. Ar < 5 CO_2 < 0.5 CO < 1 Kr < 2 H_2 < 0.5 N_2 < 5 THC < 0.2	A D 4X(Al)-100	339 (9.60) 15 (.425) 3.53 (.10)	540 540 540	A01-A-42016 A05-X-42016 A34-F-42016	**GASGUARD®** 3- or 4-valve Gas Panel with pigtail		217
	Individual Certificate of Analysis is included with each cylinder. F.O.B. Hometown, PA; Chicago, IL; and Research Triangle Park, NC				**Single-Stage Regulators** E11-215D0X	0-100	177
ULTRAPURE CARRIER 99.996% Guaranteed Spec. N_2 < 15 THC < 0.5 H_2O < 1	A C	339 (9.60) 90 (2.55)	540 540	A01-T-42014 A03-L-42014	**Single-Stage Regulators** E11-215D0X	0-100	177
	Batch Certificate of Analysis available upon request. Recommended for TOC analyzers. F.O.B. Hometown, PA; Chicago, IL; Mountain View, CA; and Research Triangle Park, NC						
UHP/ZERO 99.8% Guaranteed Spec. THC < 0.5 H_2O < 3.5	A C	339 (9.60) 90 (2.55)	540 540	A01-4-42013 A03-W-42013	**Single-Stage Regulators** E11-215D0X	0-100	177
	Batch Certificate of Analysis available upon request. F.O.B. Hometown, PA; Chicago, IL; Mountain View, CA; and Research Triangle Park, NC						

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PURE GASES | GAS MIXTURES
EQUIPMENT | SAFETY | ORDERING

Please note: The specifications found in the catalog are specific to the U.K. and Ireland.

Pure Gases

- Acetylene C_2H_2
- Air Synthetic 21% O_2+79% N_2
- Ammonia NH_3
- Argon Ar
- Arsine AsH_3
- Boron Trichloride BCl_3
- Boron Trifluoride BF_3
- Butane (n-) n-C_4H_{10}
- Butene-1 C_4H_8
- Carbon Dioxide CO_2
- Carbon Monoxide CO
- Chlorine Cl_2
- Deuterium D_2
- Dichlorosilane SiH_2Cl_2
- Disilane Si_2H_6
- Ethane C_2H_6
- Ethylene C_2H_4
- Ethylene Oxide C_2H_4O
- Fluorine F_2
- Halocarbon 14 CF_4
- Halocarbon 22 $CHClF_2$
- Halocarbon 23 CHF_3
- Halocarbon 116 C_2F_6

Pure Gases

This section provides details of the pure gaseous and liquids chemicals, their respective purities and cylinder sizes most commonly supplied by Air Products in Europe. However, this is only a sample of the full range of products, purities and cylinder sizes that Air Products is able to supply. We shall be pleased to receive enquiries for products or purities not shown in this section.

To see the details on one of our products, click on the product name on your left side.

Would you like more information or to leave us a message?

YES

Air Products Home - Special Gases Home - Feedback - Help - Search

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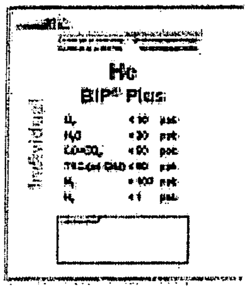
AIR PRODUCTS

EXPERIS™
Ultra High Purity Gases

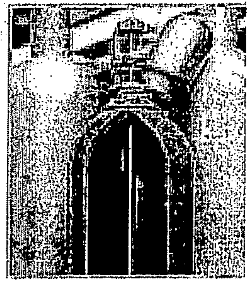
- Purity
- Accuracy
- Stability

Experis ultra high purity gases have been specifically designed for the analytical user. They contain the lowest levels of critical impurities available on the market. When combined with our patented BIP® technology you will enjoy product consistency, reliable analytical results and trouble free operation.
Air Products understands the critical importance of UHP gases and the impact of impurities on your results. Our range of Experis UHP gases will meet your most stringent requirements.

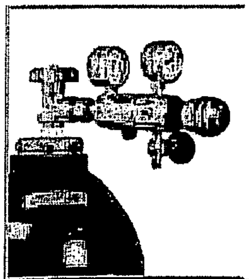
Experis Gases
Whatever your application, be it chemical analysis or process control, our Experis UHP range offers you the optimum gas solution. Acetylene, air, argon, carbon dioxide, helium, hydrogen, nitrogen, and oxygen are available with a range of purity levels. They can be supplied in a cylinder size to suit your specific requirements, from small 0.4 litre cylinders to packs of 18 large cylinders.


He
BIP® Plus

Certified Purity
It is not just the ultra high purity of the gas that offers peace of mind, but also the certainty of knowing the maximum level of specific impurities contained in the gas. Understanding which impurities, and at what level, interfere with your specific analysis, enables us to provide you with a range of gases and grades which enable you to achieve the most accurate results. Our Experis specialists can assist you in selecting the optimum gas for your application. All Experis UHP gases come with certified maximum impurity levels and, of course, our quality assurance systems are ISO 9000 certified.



BIP cylinders
Our unique BIP cylinders, using a patented method for removing impurities as the gas is withdrawn from the cylinder, offer the very highest purity levels for the most demanding laboratory applications. Every BIP cylinder contains less than 10 ppb of oxygen and less than 20 ppb of water. BIP nitrogen, helium and argon are 300 times purer compared with the equivalent industrial product. BIP technology gives you the ultimate zero gas; this means longer chromatographic column life, ultra low dew points and zero process contamination.



Gas Equipment
The use of specially designed and engineered gas control equipment ensures that gas reaches the point of use not only at the required purity, but also at the required pressure and flow rate. At Air Products, we use our expertise in ultra high purity gases and their applications to offer you a comprehensive range of UHP gas control equipment, including regulators and manifolds. All equipment is designed to the highest standards and is extensively leak-tested. We also offer an extensive design, build and install service giving you complete peace of mind whatever your application.

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Ultra High Purity Gases : standard specifications

Other sizes, purities or analyses available on request. Please contact Air Products

*Equivalent watercapacity in litres, details below

Grade	Specifications (in ppm molar when not specified)							Purity	Cylinder size*									Certificate of conformity
									Cylinders					Banks				
	PH_3	H_2S							30	40					12x50			C_2H_2
Premier	10	10						2.6	✓	✓					✓			Batch
	H_2O	O_2	THC[1]	$CO+CO_2$	Ar	$NO_X/NH_3/SO_2/H_2S$			10	47				11x47				Air
Zero (21% O_2 +/-1%)	3	-	0.2	1	-	-		4.8	✓	✓				✓				Batch
Zero Plus (20.8% O_2 +/-0.2%)	0.5	-	0.05	0.1	0.01	ND[3]		6.0	✓	✓								Individual
	H_2O	O_2	THC[1]	$CO+CO_2$	N_2				0.4	2	9	10	47	11x47	12x50			Ar
Premier	2	2	0.1	-	4			5.2			✓	✓	✓	✓				Batch
BIP®	0.02	0.01	0.1	0.1	1			5.7					✓		✓			Batch
BIP® Plus	0.02	0.01	0.05	0.05	0.3			6.6					✓					Individual
5.5	1	1	0.1	0.5	2			5.5		✓								Batch
6.0	0.5	0.1	0.05	0.05	0.3			6.0	✓			✓						Individual
	H_2O	O_2	THC[1]	$CO+CO_2$	H_2	CFC[2]				2	9	10	47	11x47	12x50			N_2
Premier	2	3	0.5	-	-	-		5.2		✓	✓		✓	✓				Batch
BIP®	0.02	0.01	0.1	0.5	1	-		5.7					✓		✓			Batch
BIP® ECD	0.02	0.01	0.1	0.5	1	0.001		5.7					✓					Batch
BIP® Plus	0.02	0.01	0.05	0.05	0.05	-		6.8					✓					Individual
5.5	1	2	0.1	0.5	1	-		5.5				✓						Batch
6.0	0.5	0.4	0.05	0.05	0.05	-		6.0				✓						Individual
	H_2O	O_2	THC[1]	CO	N_2				0.4	2	9	10	47	11x47				CO_2
Premier	7	10	5	2	25			4.5	✓		✓		✓	✓				Batch
Premier Liquid	7	10	5	2	25			4.5			✓		✓					Batch
UltraPure	2	0.5	0.1	0.5	2			5.5					✓					Individual
UltraPure Liquid	2	0.5	0.1	0.5	2			5.5					✓					Individual
	H_2O	O_2	THC[1]	$CO+CO_2$	N_2	H_2	CFC[2]		0.4	2	9	10	47	11x47	12x50	17x50	18x50	He
Premier	2	1	0.5	-	5	-	-	5.2	✓			✓	✓	✓				Batch
BIP®	0.02	0.01	0.1	0.5	1	-	-	5.7					✓		✓			Batch
BIP® ECD	0.02	0.01	0.1	0.5	1	-	0.001	5.7					✓					Batch
BIP® Plus	0.02	0.01	0.05	0.05	0.1	0.1	-	6.7					✓		✓			Individual
5.5	1	0.5	0.1	0.5	1	-	-	5.5				✓		✓			✓	Batch
6.0	0.5	0.1	0.1	0.1	0.1	-	-	6.0				✓				✓		Individual
	H_2O	O_2	THC[1]	$CO+CO_2$	N_2				0.4			10	47	11x47	17x50			H_2
Premier	2	1	0.2	1	5			5.0					✓					Batch
Premier Plus	2	1	0.1	0.5	5			5.2	✓			✓	✓	✓	✓			Batch
UltraPure	1	0.5	0.1	0.5	2			5.5					✓					Batch
UltraPure Plus	0.5	0.1	0.05	0.05	0.2			6.0				✓	✓	✓				Individual
	H_2O	O_2	THC[1]	$CO+CO_2$	N_2	H_2	Ar		0.4			10	47	11x47				O_2
Premier	5	-	1	1	40	1	-	4.5					✓					Batch
UltraPure	1	-	0.5	0.5	5	0.5	-	5.2	✓			✓	✓	✓				Batch
UltraPure Plus	0.5	-	0.1	0.1	1	0.1	0.1	5.8				✓	✓					Individual

Description of the cylinder sizes

Watercapacity	Air Products code	Description	Approximate contents[4]	Old code for reference only
0.4 L	X0.4S	Lecture bottle Steel	0.1 m³	LB
2 L	X2S	Steel cylinder	0.4 m³	B2
9 L	X9S/X9A	Steel cylinder	1 m³	F/FA
10 L	X10S	Steel cylinder	2 m³	PT10
30 L	X30S	Steel cylinder	5 m³	MD30
40 L	X40S	Steel cylinder	7 m³	Y41
47 L	X47S	Steel cylinder	10 m³	K/L
11x47 L	11X47S	11 cyl. bank	110 m³	PL11
12x50 L	12X50S	12 cyl. bank	120 m³	PB50
17x50 L	17X50S	17 cyl. bank	170 m³	P50W
18x50 L	18X50S	18 cyl. bank	180 m³	VB50

Remarks :

- Other sizes, qualities and analyses available on request
- Usual filling pressure : 200 bar.g
- The above data can be subject to changes
- [1]. THC = as CH_4
  [2]. CFC = halocarbons
  [3]. ND = non detectable
  [4]. Except for CO_2

For more information, please refer to "FAQ about chromatographic gases" or contact your Experis™ specialist !

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Scott Specialty Gases
SEMICONDUCTOR & ELECTRONIC APPLICATIONS

Pure Gases, Mixtures & Delivery Equipment

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Pure Gas Products

The standard grades of pure gases and liquids listed here have been chosen to meet the varied requirements of lab and process engineers throughout the semiconductor industry. For example, Scott offers an exceptionally high grade of argon to reduce impurities in sputtering depositions. Scott Electronic Grade pure gases and liquids meet or exceed SMI specifications. Scott Sputtering, U.L.S.I., V.L.S.I., Etchant, Sigma 3 and Nitride grades are of higher purity and exceed SEMI specifications where they exist. In addition, Scott extensive purification capabilities and processes enable us to provide custom grades of pure gases and liquids for the fab engineer with specialized requirements. Further, we are a one-stop source for supplying your new and unusual materials needs. Contact your Scott Representative for more information about custom pure gases and liquid products.

Pure gases and liquids are listed alphabetically. Each product includes useful technical information, available cylinder sizes with pressures and contents, along with appropriate safety information.

Recommendations for regulators, purge panels and gas cabinets are also provided for safe handling of the product. Many of our listings include a product shelf life period that has been thoroughly tested and documented.

A number of products such as Halocarbon 14, helium and nitrogen are sold in a gaseous state. Others such as boron trichloride, hydrogen chloride and nitrous oxide are sold as liquids. For liquid-state products, vapor pressure at 70°F and boiling points at one atmosphere are included in product listings. Complete vapor pressure curves are available upon request. Each gas listing includes a specification table detailing total purity as well as guaranteed maximum concentrations of critical impurities. We have made every effort, based on input from our customers, to establish meaningful specifications for both purity assays and impurity specifications. To validate the impurity levels in the products we deliver, Scott has prepared sets of master trace gas standards for pure gas analysis.

Order toll-free: **866-704-6513** or Contact Us

- Ammonia / NH_3
- Argon / Ar
- Arsine / AsH_3
- Boron Trichloride / BCl_3
- Boron Trifluoride / BF_3
- Carbon Dioxide / CO_2 *
- Carbon Monoxide / CO
- Chlorine / Cl_2
- Diborane / B_2H_6 *
- Dichlorosilane / SiH_2Cl_2
- Germane / GeH_4
- Halocarbon 14 (Tetrafluoromethane) / CF_4
- Halocarbon 23 (Trifluoromethane) / CHF_3
- Halocarbon 32 (Difluoromethane)- Zyron 32 / CH_2F_2 *
- Halocarbon 41 (Methyl Fluoride) / CH_3F *
- Halocarbon 116 (Hexafluoroethane) / C_2F_6
- Halocarbon 125 (Pentafluoroethane)- Zyron 125 / C_2HF_5
- Halocarbon 134a (1,1,1,2-Tetrafluoroethane)- Zyron 134a / $C_2H_2F_4$ *
- Halocarbon 218 (Perfluoropropane) / C_3F_8 *
- Helium / He
- Hydrogen / H_2
- Hydrogen Bromide / HBr *
- Hydrogen Chloride / HCl
- Methane / CH_4
- Neon / Ne
- Nitric Oxide / NO *
- Nitrogen / N_2
- Nitrogen Trifluoride / NF_3
- Nitrous Oxide / N_2O *
- Oxygen / O_2
- Phosphine / PH_3
- Silane / SiH_4
- Silicon Tetrachloride / $SiCl_4$
- Silicon Tetrafluoride / SiF_4 *
- Sulfur Hexafluoride / SF_6 *
- Trichlorosilane / $SiHCl_3$
- Xenon / Xe

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- Halocarbon c-318 (Octafluorocyclobutane) / C_4F_8

* MSDS Sheets available

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Scott Specialty Gases
SEMICONDUCTOR & ELECTRONIC APPLICATIONS

Pure Gases, Mixtures & Delivery Equipment

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Pure Gases | Gas Mixtures | Equipment | Tech Data

Oxygen O_2

DESCRIPTION: Oxygen (O_2) is a colorless, odorless, nontoxic, highly oxidizing gas which sustains life and vigorously supports combustion. Oxygen is normally compressed and shipped at high pressures.

APPLICATION: Oxygen in high-purity is used in a broad range of oxidation, plasma etching and chemical vapor deposition (CVD) processes.

Order **Oxygen** toll-free: **866-704-6513** or Contact Us

OXYGEN		
GRADE	MOS	VLSI
Critical Assay	99.97%	99.994%
Meets Semi Specification	SEMI C3.16-95	SEMIC3.23-95
Nitrogen	< 100 ppm	< 15 ppm
Total Hydrocarbons (as CH4)	< 1 ppm	< 0.1 ppm
Carbon Dioxide	< 2 ppm (+CO)	< 0.5 ppm
Water	< 2 ppm	< 1 ppm
Carbon Monoxide	-	< 0.5 ppm
Nitrous Oxide	< 2 ppm	< 1 ppm
Argon	< 50 ppm	< 15 ppm
Rare Gases	-	< 10 ppm
Valve Material	Brass	Brass/Monel®
Valve Design	Diaphragm	Diaphragm
CGA/DISS Connection	540	540

Molecular Weight: 32.0
Specific Volume: 12.1 cf/lb @ NTP
Boiling Point: -297.4°F @ 1 atm
CAS No.: 7782-44-7
Hazards: High Pressure and Oxidizer

Safety Data: Supports Life
Physical Properties Data:
Critical Temperature: -181.4°F
Critical Pressure: 731.4psia

OXYGEN

Cylinder Data/Size	K	A	B	C
Internal Volume (liters):	50	44	17	7
Contents (cubic feet):	308	249	90	36
Pressure @ 70°F (psig):	2,400	2,200	2,000	2,000

DOT Label: Green, Nonflammable Gas; Yellow, Oxidizer
UN Number: UN 1072
DOT Class: 2.2
Cylinder: Steel alloy

Recommended Regulators: Two-Stage, Brass - Model 218 series
Single-Stage, Brass - Model 2300 series

Shelf Life: 3 years

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(650) 368-2821 Labs | Company | E-Mail | Industrial | Vendors

Gases Information | Bulk Gas | Mixed Gas | Pure Gas | Specialty Gas | Gas Safety

PURE GAS

- > Top
- > Acetylene
- > Air
- > Ammonia
- > Argon
- > n-Butane
- > Carbon Dioxide
- > Carbon Monoxide
- > Chlorine
- > Deuterium
- > Ethane
- > Ethylene
- > Helium
- > Hydrogen
- > Hydrogen Chloride
- > Krypton
- > Methane
- > Methyl Chloride
- > Neon
- > Nitrogen
- > Nitrous Oxide
- > Oxygen
- > Propane
- > Propylene
- > Sulfur Dioxide
- > Sulfur Hexaflour
- > Xenon

PURE GAS INFORMATION & TABLES

Assurance of Gas Purity

Our primary vendor BOC Gases is the worlds largest producer of industrial gases. With more than 75 years experience, they supply us with the highest purity of product attainable today. The following pure gases are classified by Grade, this eliminates any question about purity levels of the gases sold to our customers.

Classification	Minimum Purity	Total Impurites
Grade 6	99.9999 %	1 ppm
Grade 5.5	99.9995 %	5 ppm
Grade 5	99.999 %	10 ppm
Grade 4.5	99.995 %	50 ppm
Grade 4	99.99 %	100 ppm
Grade 3.5	99.95 %	500 ppm
Grade 3	99.9 %	1,000 ppm

Equipment Recommendations

Each pure gas listing includes equipment recommendations for regulators. We strongly urge that you select this equipment, it has been chosen because it meets the requirements of the gas to assure you receive reliable delivery of product from the cylinder.

Purity Specifications

For more detailed information regarding the break down of purity specifications, contact one of our SALES ASSOCIATES via Email in order to receive a Gas Vendor Catalog, or call us today at **(650) 368-2821.**

Visit our VENDORS page for more information on BOC Gases,
Matheson Gas Products and Air Products .

For CATALOGS > E-Mail > CATALOGS@wesco-gas.com

PURE GASES

Acetylene > C2H2 .

Grade	Purity	Cyl. Size US	Contents @ NTP cf	Pressure (psig) @70 F	Valve
Atomic Absorption Grade 2.6	99.6 %	5	330	250+	CGA 510
		4	100	250+	
		3	60	250+	

Air .

Grade	Cyl. Size US***	Contents @ NTP cf	Pressure (psig) @70 F	Valve
	300	310	2640	

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